THE CINCINNATI GAS & ELECTRIC COMPANY

CINCINNATI, OHIO 45201

E. A. BORGMANN
SENIOR VICE PRESIDENT



Docket No. 50-358

September 22, 1981

Mr. Harold Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1 - SUPPLEMENTAL INFORMATION IN RESPONSE TO NRC LETTER OF DECEMBER 22, 1980 REGARDING CONTROL OF HEAVY LOADS

Dear Mr. Denton:

In reply to the NRC letter of December 22, 1980 from Darrell G. Eisenhut to all licensees of operating plants and applicants for operating licenses and holders of construction permits, there are attached eight copies of supplemental information in response to Sections 2.2 and 2.3 of Enclosure 3 to the above referenced NRC letter. Our response to Section 2.1 of Enclosure 3 to the above referenced NRC letter was submitted on June 24, 1981.

Very truly yours,

THE CINCINNATI GAS & ELECTRIC COMPANY

By E. A. Borgmann
E. A. BORGMANN

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EAB:dew
Enclosure
cc: Without Enclosure
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State of Ohio )
County of Hamilton) ss

Sworn to and subscribed before me this 22nd day of September, 1981.

Marilyn J. Luersen
Notary Public
MARILYN J. LUERSEN
Notary Public, State of Ohio
My Commission Expires June 7, 1986

DOCKET NO. 50-358

WM. H. ZIMMER NUCLEAR POWER STATION

UNIT 1

CONTROL OF HEAVY LOADS

September 22, 1981

DOCKET NO. 50-358

WM. H. ZIMMER NUCLEAR POWER STATION

UNIT 1

CONTRO' ... AVY LOADS

Se... ...r 22, 1981

In response to Darrell G. Eisenhut's December 22, 1980 letter concerning control of heavy loads we submit the following information:

Question

2.2.1 Identify by name, type, capacity and equipment designator, any cranes physically capable (i.e., ignoring interlocks, movable mechanical stops, or operating procedures) of carrying loads over spent fuel in the storage pool or in the reactor vessel.

Response

2.2.1 The following cranes are physically capable of carrying loads over the spent fuel in the storage pool or in the reactor vessel.

| Table 1 Item No. | Equipment No. | Name | Type | Capacity |
|---|---|---|---|---|
| 101 | 1HC01G | Main Reactor Bridge Crane | Bridge Crane | 110 Ton Main Hook and 10 Ton Auxiliary Hook |
| 102 | 1HC02RB | Fuel Handling Jib Crane | Jib Crane | 1 Fuel Assembly and handling tool |
| 103 | 1HC03RB | Channel Handling Boon Jib Crane | Jib Crane | 200 lbs. |
| 104 | 1HC04RB | Fuel Handling Jib Crane | Jib Crane | 1 Fuel Assembly and handling tool |
| 113 | 1HC13RB | Refueling Platform | Bridge Crane | 1 Fuel Assembly and handling tool |

| | | | | |
|---|---|---|---|---|
| 115 | 1HC15RB | Service Platform Jib Crane | Jib Crane | 1 Fuel Assembly and handling tool |

Question

2.2.2 Justify the exclusion of any cranes in this area from the above category by verifying that they are incapable of carrying heavy loads or are permanently prevented from movement of heavy loads over stored fuel or into any location where, following any failure, such a load may drop into the reactor vessel or spent fuel storage pool.

Response

2.2.2 Heavy loads are defined as loads greater than 1 fuel assembly plus the weight of the handling tool. Based on the above heavy load definition all cranes on the refueling floor except for the main reactor building bridge crane, 1HC01G, can be excluded from review.

Question

2.2.3 Identify any cranes listed in 2.2.1, above, which you have evaluated as having sufficient design features to make the likelihood of a load drop extremely small for all loads to be carried and the basis for this evaluation (i.e., complete compliance with NUREG 0612, Section 5.1.6 or partial compliance supplemented by suitable alternative or additional design features). For each crane evaluated, provide the load handling system (i.e., crane loading combination) information specifying in Attachment 1.

Response

2.2.3 The main reactor building bridge crane main hook (110 ton) (equipment no. 1HC01G) has been reviewed in detail in the Safety Evaluation Report (SER) and accepted. Section 9.1.4, Fuel Handling Systems (pages 9-3 and 9-4) of the SER addressed the bridge crane. The crane is described in detail in FSAR Section 9.1.4.2.2. In addition, as stated in the SER, it was concluded in the SER that the fuel handling system is designed to safely handle fuel assemblies from receipt of new fuel to shipping fuel. The load handling system for the reactor building bridge crane main hook are listed in

Table 2 which has been revised from the table previously submitted.

The narrative contained in the Wm. H. Zimmer Nuclear Power Station FSAR, Section 9.1.4.2.2, describes the design features incorporated in the 110 ton bridge crane. These features provide reasonable assurance that safe handling of heavy loads on the plant refueling elevation is accomplished.

The load handling systems listed in Table 2 were selected to meet the requirements of NUREG 0612 Section 5.1.6, (1), (b), (i), or (ii) i.e. redundant slings are provided such that a single component failure or malfunction in the sling will not result in uncontrolled lowering of the load, or in selecting the sling, the load used will be twice the static load required.

The adequacy of interfacing lift points for refueling floor loads are under review by our architect engineers. Equipment design changes will be accomplished if necessary. Changes to equipment such as the reactor vessel head or vessel intermals would only be completed if added safty warrants any possible deleterious effects to the components. The shackle selected for lifting the spent fuel pool plugs was limited by physical dimension constraints and only provides a safety factor of 6.5 to ultimate breaking strength. Any changes made to the interfacing lift point would of course provide for use of equipment of a greater rating.

Question

2.2.4 The cranes identified in 2.2.1, above, not categorized according to 2.2.3, demonstrate that the criteria of NUREG 0612 Section 5.1 are satisfied. Compliance with criteria IV will be demonstrated in response to Section 2.4 of this request. With respect to criteria I thru III, provide a discussion of your evaluation of determination of compliance.

Response

2.2.4 The following cranes are addressed in 2.2.4 which are not excluded by 2.2.3.

| M-19 Sheet 12 Item No. | Equipment No. | Name | Type | Capacity |
|---|---|---|---|---|
| 101 | 1HC01G | Main Reactor Building Bridge Crane (Aux Hook only) | Bridge Crane | 10 ton Auxiliary Hook |
| 102 | 1HC02RB | Fuel Handling Jib Crane | Jib Crane | 1 Fuel Assembly and handling tool |
| 103 | 1HC03RB | Channel Handling Boon Jib Crane | Jib Crane | 200 lbs. |
| 104 | 1HC04RB | Fuel Handling Jib Crane | Jib Crane | 1 Fuel Assembly and handling tool |
| 113 | 1HC13RB | Refueling Platform | Bridge Crane | 1 Fuel Assembly and handling tool |
| 115 | 1HC15RB | Service Platform Jib Crane | Jib Crane | 1 Fuel Assembly and handling tool |

The Reactor Building Bridge Crane auxiliary hook (10 tons) does not meet the single failure criteria. The use of this crane is limited to a maximum load of 1 fuel assembly and its handling tool when operating over the spent fuel pool. The 10 ton

auxiliary hook is also used for hoisting new fuel, replacement control rods, fuel channels and incore detector strings from the equipment access building to the refueling floor. The auxiliary hook is utilized during new fuel inspection for the transport of individual shipping crates and fuel assemblies during the fuel inspection process.

In addition to the above loads, the 10 ton auxiliary hook is used to move loads which are stored along the west wall and can not be reached with the main hook. Lateral movements of these loads shall be kept to the minimum required for attachment to the main hook.

The jib cranes and the refueling platform operate over the spent fuel and the vessel. If a postulated accidental drop of a load crane caused damage to the spent fuel, release of radioactive materials shall be contained as addressed in the FSAR. The Fuel Pool Ventilation Exhaust Plenum Radiation Monitoring Subsystem (See FSAR Section 7.1.2.1.1?,7.? and 7.6.2.3.7) will initiate control signals in the event the radiation level exceeds a predetermined level to isolate the fuel pool vent syst , to initiate the standby gas treatment system, and to close containment purge and vent valves. The redundancy and arrangement of channels assure that no single failure can prevent isolation when required. During refueling operation, the monitoring system acts as an engineered safeguard against the consequences of a refueling accident or the rod drop accident. The above actions will assure the 10CFR100 limits are met. In addition, the main Plant Vent Stack Radiation Monitoring subsystem (see FSAR Section 7.1.2.11.6) monitors the radioactivity within the main plant stack to generate alarms if the activity level reaches either short term or long term release limits.

The Reactor Building Ventilation and Pressure Control System (see FSAR Section 7.1.2.1.14) is designed to hold the Reactor Building pressure at a negative pressure of 1/4" $H_2O$ gauge under all normal operating conditions. If radioactivity is detected in the exhaust gas from the building, the control system isolates the building and directs the ventilation exhaust to the standby gas treatment system. The standby gas treatment system control and instrumentation (see FSAR 7.1.2.1.27) are designed to meet the following safety designs bases:

a. Start the standby gas treatment system to maintain the reactor building at a negative pressure to assure infiltration and to filter the radioactive particulates and

iodine from the influents in the case of a loss of coolant accident or fuel handling accident.

b. The standby gas treatment system will respond automatically so that no action is required of station operators following a loss of coolant accident or fuel handling accident.

c. The responses of the standby gas treatment system will be indicated on the main control board.

d. No single failure, maintenance, calibration or test operation will prevent operation of the standby gas treatment system.

e. And the physical event accompanying a loss of coolant or fuel handling accident will not prevent correct functioning of the standby gas treatment system controls and instrumentation.

The draft Technical Specifications shown in Table 3 serve to ensure operability of the standby gas treatment system and it's initiating instrumentation.

A Spent Fuel Pool Leak Detection system to monitor leakage from the fuel pool liner and seal bellows is provided to activate an annunciator in the event of a system leak of sufficient magnitude (see FSAR Section 7.6.1.6.9). Flow switches are located in the fuel pool channel drain and in the fuel pool bellows seal drain. A main control room alarm is activated when leakage reaches this predetermined value.

The fuel handling accident is addressed in Section 15.1.41 of the FSAR where the most severe accident from a radiological viewpoint is addressed. Description of the accident, operator actions, methods, assumptions and conditions are addressed in the referenced section. The results and consequences are covered in FSAR Section 15.1.41.5.1.2.

The spent fuel pool storage racks are designed to meet seismic Category 1 requirements and to withstand the impact resulting from a falling weight possessing 2000 ft-lb. kinetic energy. When subjected to this impact, those members which maintain spacing to assure keff less than or equal to 0.95 remain intact. Load movement paths are provided to avoid travel over the spent fuel pool or the reactor well. The paths shall be as direct as practical and preplanned as covered in plant implementing procedures.

The main reactor building bridge crane has electrical interlocks provided to prevent movement of heavy loads above fuel in the spent fuel pool rods. The crane operator can override and enter the interlock protected area when approved by the maintenance supervisor or shift supervisor. The keys for the interlock control bypass are controlled by the shift supervisor. The refueling floor operating procedures specifically cover the use of the override and the authorized reasons to enter the area. Overriding the interlocks shall only be done in accordance with plant implementing procedures. Movement of the fuel pool gates and shipping cask pit gate require bypassing the fuel pool interlocks. Movement of these gates shall be accomplished with the single failure proof 110 ton hook with rigging rated at $>$ two times the gate's weight.

Attached is the M-17 drawing showing the heavy load movement paths. Each heavy load shall have specific movement path selected to minimize the consequences of a load drop. Any deviation to the specified movement path shall be approved by the maintenance engineer prior to lifting the load. Crane operators shall be instructed to minimize the lift of any loads to as low as practicable.

Question

2.3.1 Identify any cranes listed in 2.1-1, above, which you have evaluated as having significant design features to make the likelihood of a load drop extremely small for all loads to be carried and the basis for this evaluation (i.e., complete compliance with NUREG 0612, Section 5.1.6, or partial compliance supplemented by suitable alternative or additional design features). For each crane so evaluated, provide the load handling system (i.e., crane load combination) information specified in Attachment 1.

Response

2.3.1 The Reactor Building Bridge Crane is the only single failure proof crane at the plant site. See Response 2.2.3.

Question

2.3.2 For cranes identified in 2.1-1 not designated as single failure proof in 2.3-1, a comprehensive hazard evaluation should be provided which includes the following information:

Question

2.3.2a. The Presentation in a matrix format of all heavy loads and potential impact areas where damage may occur to safety related equipment. Heavy loads identification should include designation and weight or cross reference to information provided in 2.1-3c. Impact areas should be identified by construction zones and elevations by some other method such that the impact area can be located on the plant general arrangement drawings.

Response

2.3.2a Attached is a matrix for all cranes (lifting loads greater than 1 fuel assembly plus handling tool) listed in Table 1 submitted in the response to Section 2.1 of Enclosure 3. The matrix references M-19 series of drawings which are the equipment removal drawings for the plant. Those drawings are based on general arrangement drawings and show equipment access paths. These matrices are included as attachment 1 to this letter.

Question

2.3.2b For each interaction identified, indicate which load and impact area combinations can be eliminated because of separation and redundancy of safety related equipment, mechanical stops and/or electrical interlocks, or other site specific considerations:

Response

2.3.2b The following equipment can be eliminated by one of the above reasons:

Item 101 Reactor Building Bridge Crane Main Hook (110T). The main hook has been addressed in Response 2.2.3. The Auxiliary Hook (10T) shall be administratively controlled to lifting item loads less than 1 fuel assembly (plus weight handling tool) over the spout fuel pool and to reach items on the west side of the reactor building and refueling floor where the main hook cannot reach. These items shall be lifted and moved a minimum distance to allow the main hook to be used. The auxiliary hook is also used, with the crane interlocks operable, to hoist new fuel shipping crates, fuel channel shipping crates, replacement control rod blade shipping crates and incore detector shipping crates to and from the equipment access building and the plant refueling floor. The auxiliary hook is utilized for movement of new fuel shipping crates during inspection of new fuel.

Item 107 RHR and RBCCW (1B) Heat Exchanger, Item 107, is a 20 ton monorail overhead hoist to be used for tube bundle removal and overhaul of the 1B RBCCW Heat Exchanger and RHR Heat Exchanger 1A and 1B. Sufficient separation exists insuring that inadvertant drop of any of the above components would not cause damage to any other system required for safe shutdown or decay heat removal. The 1B RBCCW Heat Exchanger is separated by 12 ft. from the north bank hydraulic control units and by two floors from the RHR Heat Exchangers. The RHR Heat Exchangers are located in separate cubicles and are located 2 floors below the 1B RBCCW Heat Exchanger.

Item 108 Main Steam Hatch Slabs and Isolation Valves

Administrative controls shall be applied to assure that the main steam hatch slabs are not removed during plant operation. Inadvertant dropping of the main steam hatch slabs after cold shutdown will not effect plant safety. Similarly, inadvertent dropping of any of the main steam isolation valve components or feedwater valve components, after they have been released for maintenance, will not have any effect on plant safety or decay heat removal.

Item 111 Hatch Slabs and RCIC Maintenance

Panel H22-P022 contains one steam line flow switch for each main steam line and the recirculation loop flow transmitters feeding the B flow unit for APRM flow biased scrams. Based upon single failure proof criteria employed in the design of these systems their failure can neither cause nor prevent the completion of a safety function.

Item 112 RBCCW 18 Heat Exchanger 1A

Item 112 is a 20 ton monorail overhead hoist to be used for tube bundle removal and overhaul of the 1A RBCCW Heat Exchanger. Sufficient separation exists to ensure inadvertant drop of the heat exchanger would not cause damage to any other system required for safe shutdown or decay heat removal.

Item 118 Low Pressure Core Spray

The inadvertant drop of a low pressure core spray pump component, has a very small probability of damaging the RHRA pump as evidenced by equipment separation. Even the assumed total loss of ECCS division I has no effect upon safe shutdown and decay heat removal since two redundant divisions of ECCS remain operable.

Item 119 RHR Pumps

The inadvertant drop of any RHR pump component, has a very small probability of damaging the RHR pump or LPGS pump in it's room as evidenced by equipment physical separation. Even the assumed total loss of